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AN ANNOTATED LIST OF FISHES FROM LAKE FORSYTH, ANDROS ISLAND, BAHAMAS, WITH THE DESCRIPTIONS OF THREE NEW FORMS

BY C. M. BREDER, JR.

The following list of eleven species of fishes occurring in Lake Forsyth, Andros Island, Bahamas, is in the nature of a preliminary taxonomic list on the first collection of fishes from that locality. It is to be followed by a full discussion of the ecological relationships in this peculiar, isolated lake of fresh water inhabited by marine types. The material was collected by the Bacon-Andros Expedition in February, 1932, the other results of which are in preparation.

Cyprinodon baconi, new species

Type No. 10107, American Museum of Natural History.

Standard length, 27 mm.; total length, 33.5. Head, 3.0; depth, 2.3; dorsal, 9½; anal, 9½; scales, 21. Body short, compressed; snout broad, 3.0 in head; eye, 3.2; interorbital, 3.2; mouth small, oblique, superior; teeth in jaws a single row of

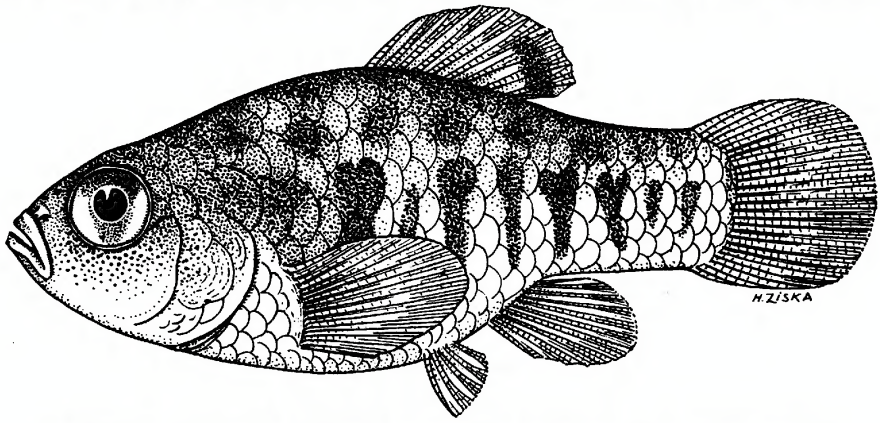

Fig. 1. *Cyprinodon baconi*, new species. Type, 27 mm. standard length.

tricuspid incisors; maxillary, 4.0. Humeral scale large; distance from its posterior edge to head equal to distance from front of eye to posterior edge of pupil; caudal peduncle 2 in head; dorsal base 2.2 in head, its longest ray falling short of root of tail by an equal distance; origin of anal scarcely in advance of end of dorsal base; caudal slightly rounded. This fish, an unripe female, shows the following pattern: body

crossed by seven broken, dark, vertical bars, the ground color silvery below and light tan above; fins plain except dorsal which has a small black spot on its posterior part, smaller than pupil.

There are forty-six paratypes of from 12 to 24 mm. in standard length.

Named for Mr. Daniel Bacon, the sponsor of the expedition that made this collection possible.

The pattern of the males is similar to that of the females, except that the males lack the dorsal spot and the underparts are bright orange instead of silvery. The young immature fish all show the dorsal spot and it disappears in the males at about a standard length of 24 mm. The scales are very weakly ciliated in the larger males, possibly none of which are fully matured.

Although this genus is clearly in need of a thorough revision, the present species is certainly distinct from any thus far known. It clearly belongs to the *C. variegatus-riverendi-dearboni* group with its enlarged humeral scale and pattern in both sexes not unlike that of the females of these others. It differs distinctly from those species and all others in the small scale count 21 ± 1 as against 24 to 26 in the others of this group, in the slight amount of sexual dimorphism, and the dwarf size at which maturity is reached. The type represents the largest specimen collected or seen.

The West Indian species of *Cyprinodon* may be separated by the following tentative key.

A. Humeral scale larger than the others; dorsal, 9 to 11; depth, 2.0 to 2.6; scales 20 to 26.

B. Scales, 24 to 26; head, 2.7 to 3.6; sexual dimorphism well marked.

C. Scales, 26; anal of male not edged with black; depth, 2.0 to 2.6; head, 3.25 to 3.4; (Cape Cod to Rio Grande).....*C. variegatus* Lacépède.

CC. Scales, 24; anal of male edged with black.

D. Depth, 2.0; head, 3.3; coloration light, not nearly black; (Cuba and Florida. Keys).....*C. riverendi* (Poey).

DD. Depth, 2.1 to 2.5; head, 2.7 to 2.9; coloration dark, nearly black; (Curacao). *C. dearborni* Meek.

BB. Scales, 20 to 22; head, 2.7 to 3.0; sexes similar in pattern except for female dorsal spot; (Andros Island).....*C. baconi*, n. sp.

AA. Humeral scale little if at all enlarged; dorsal 9 to 12; depth, 2.75 to 4; scales, 26 to 30.

E. Depth, 2.75; dorsal, 12; scales, 30; (Cuba).....*C. felicanus* (Poey)

EE. Depth, 4; dorsal, 9; scales, 26; (Santa Marta, Colombia). *C. martæ* Steindachner.

Gambusia manni Hubbs

Common but not abundant in places little or not at all frequented by larger species. Generally found in small lakeside pools of from about one foot in diameter upward. These are subject to rapid diurnal changes in temperature, as well as in chemical composition, due to sudden showers.

Strongylura notata forsythia, new subspecies

Type No. 10108, American Museum of Natural History.

Standard length, 245 mm.; total length, 269 mm.; depth, 1.4 in postocular part of head. Head, 2.5; pectoral in postocular part of head, 1.1; ventral in postocular part of head, 2.0; eye in postocular part of head, 2.15; snout, 1.55; interorbital in postocular part of head, 2.2; width of head in postocular part of head, 1.3; width of body in postocular part of head, 1.5; depth of peduncle in eye, 1.5; dorsal base in postocular part of head, 0.85; anal base in postocular part of head, 0.95; longest dorsal ray in postocular part of head, 1.1; longest anal ray in postocular part of head, 1.05; lower caudal lobe in postocular part of head, 0.8; anal base in dorsal base, 1.1.

Dorsal, 14; anal, 14; lateral line about 145; predorsal scales about 95; ventral insertion midway between base of caudal and head. Head broad and flat above, its depth 0.95 in width; postocular part of head 4.2 in head.

Coloration as in *S. n. notata*, but red on dorsal, anal and caudal fainter and body with a general tendency to less brilliancy than in the marine form.

There are twenty-one paratypes of from 105 to 237 mm. in standard length.

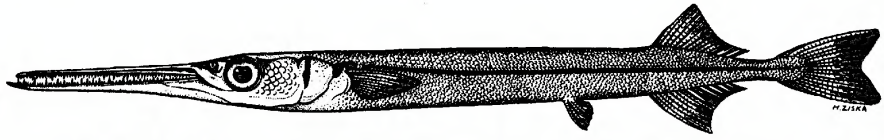

Fig. 2. *Strongylura notata forsythia*, new subspecies. Type, 245 mm. standard length.

Named for the only region in which it is known to occur.

This fish has been given subspecific status for the following reasons. Compared with material from Key West and Chub Cay, Bahamas, certain measurements show a progressive shift in averages and extremes suggesting proportional changes as one moves eastward from Key West to Chub Cay and then southward to Lake Forsyth.

It will be noted in the accompanying tabulation of measurements that in progressing from left to right the averages of the first two measures are in a descending order and that in the last two measures the Chub Cay fishes are high, descending to either side. The minimum values for all descend from right to left or at least drop in the lake Forsyth

MEASUREMENTS

	12 Specimens Key West			8 Specimens Chub Cay			13 Specimens Lake Forsyth		
	Min.	Aver.	Max.	Min.	Aver.	Max.	Min.	Aver.	Max.
Eye+Postorbital part of head in head	*3.20*	3.33	*3.50*	*3.20*	3.30	*3.40*	*2.80*	2.98	*3.10*
Eye in Postorbital part of head	*2.10*	2.26	*2.30*	*2.00*	2.05	*2.10*	*1.80*	2.00	*2.20*
Eye in interorbital	*1.00*	1.01	*1.15*	*1.00*	1.02	*1.10*	*0.90*	0.93	*1.00*
Caudal root to ventral insertion in ventral insertion to head	*0.95*	0.99	*1.10*	*0.95*	1.03	*1.10*	*0.85*	1.01	*1.20*

material if equal in the other two sets (i.e., first, third, and fourth). The maximum values of the first and third descend from right to left, whereas the second and fourth show the Chub Cay material to be low, which, expressed another way, indicates a greater variation for the Lake Forsyth specimens. In all cases except the first there is sufficient overlapping to allow the entire matter to be referred to statistical variability. In the first, however, there is a distinct but small break between the maximum from Lake Forsyth and the minimum from the marine localities. More material might easily bridge it. This condition and the other differences indicated in the description, such as the more numerous predorsal scales and the coloration, indicate a definitive difference but one too small to be considered as worthy of full specific rank.

A key to separate these two subspecies may be constructed as follows:

A. Predorsal scales, 80 to 85; eye and postorbital part of head in head, 3.2 to 3.5; dorsal, anal, and caudal touched with brick-red; (West Indies—marine). *S. n. notata* (Poey).

AA. Predorsal scales, 93 to 98; eye and postorbital part of head in head, 2.8 to 3.1; dorsal, anal, and caudal touched with pinkish; (Lake Forsyth—fresh water) ..... *S. n. forsythia*, n. subsp.

Strongylura timucu (Walbaum)

A single specimen of this widely distributed species was taken in the headwaters of Lake Forsyth. Standard length, 290 mm. This fish is *S. timucu* of Breder, 1925, distinct from *S. ardeola* (C. and V.) of Nichols and Breder, 1928, and Breder, 1929, which has been erroneously synonymized with *S. timucu* by Jordan, Evermann, and Clark, 1930.

Chriodorus atherinoides Goode and Bean

Generally common but difficult to seine. Five specimens of from 77 to 105 mm. in standard length.

Caranx latus Agassiz

Abundant. Sometimes at night these could be heard jumping, but at no time was such activity common. Twenty-three specimens of from 92 to 180 mm. in standard length.

Lutianus griseus (Linnæus)

Generally to be found wherever mangrove roots entered the water. For this reason they were not readily seined and could not be taken on a hook because of the persistence of the extremely abundant *Eucinostomus*. Two specimens of 124 and 175 mm. in standard length.

Eucinostomus californiensis (Gill)

The dominant species in Lake Forsyth. Extremely abundant at all collection sites. A large series of several hundred are being held for further study. They range from a few millimeters to about 150 in standard length.

Tetraodon testudineus Linnæus

A single example of 155 mm. in standard length was taken in the headwaters of Lake Forsyth.

Gobiomorus dormitor Lacépède

Two specimens of 87 and 110 mm. in standard length were taken.

Lophogobius androsensis, new species

Type No. 10109, American Museum of Natural History.

Standard length, 38 mm.; total length, 46.5 mm. Head, 3.4; depth, 4.1; dorsal, VI–10; anal, 9; scales, 25. Body robust, slightly compressed; the back elevated; head short, broad; snout short, blunt, 4.4 in head; eye, 3.8 in head; interorbital, 2.1 in eye; mouth oblique, the lower jaw somewhat projecting; maxillary reaching vertical from anterior edge of pupil, 2.6 in head; teeth in jaws in villiform bands, opercle and preopercle unarmed, gill openings restricted to sides, broader than pectoral base, membranes attached to isthmus, forming a fold across it; scales large, ctenoid, absent on head and nape; a fold of skin extending from a vertical over the posterior edge of pupil nearly to end of head but not connected to the dorsal; a space between anterior ray of dorsal and this crest equal to diameter of eye; height of crest equal to pupil; dorsal fins separate, the first one with slender filamentous spines, the median ones longest, the largest spine 2 in head, the second dorsal high but its longest ray (depressed) not reaching to narrowest part of caudal peduncle; caudal fin rounded, the median rays longest, the fin 1.3 in head; ventral fins united forming a sucking disc entirely free from abdomen; pectoral fins large, pointed, the central rays longest,

reaching slightly beyond origin of anal, a little longer than head; anal base two-thirds of dorsal base; anal insertion midway between tip of longest anal ray (depressed) and pectoral axil; ventral fins fall short of anal by the length of the maxillary; dorsal origin behind pectoral insertion.

Color in alcohol pale with three brown lateral stripes, the upper one running from upper margin of orbit to origin of second dorsal. The second from center of eye to upper profile of peduncle, posteriorly breaking into three diffuse spots, the first two under second dorsal and the third on peduncle. The third stripe wider and fainter, extending from pectoral axil to caudal base, breaking into five diffuse blotches posteriorly, the first three slightly in advance of those of the second stripe. Viewed dorsally there are two somewhat broken stripes paralleling the crest of skin. A brown ring on the snout. Spinous dorsal barred with black; soft dorsal, anal and caudal

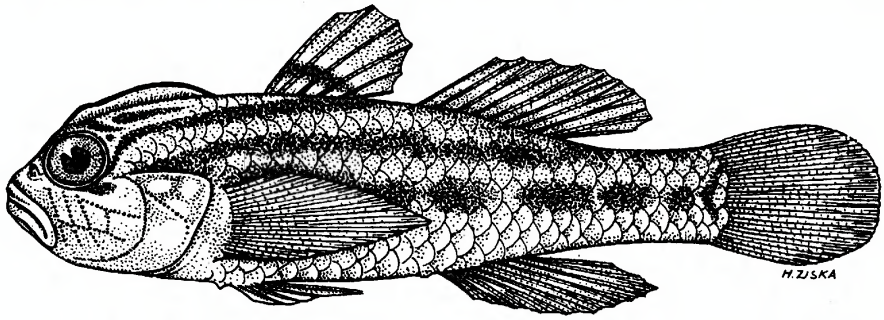

Fig. 3. *Lophogobius androsensis*, new species. Type, 38 mm. standard length.

dusky, slightly darker than ground color of body. Crest with a distinct narrow dark edge for its entire length, a dark line on cheek from lower margin of orbit to pectoral narrower than the rest. Pectorals and ventrals light dusky.

There are three paratypes ranging from 29 to 43[1] mm. standard length.

Named for Andros Island.

This form is distinguished from its two congeners by the smaller and more anterior anal; the shorter soft dorsal; the smaller ventral fins; the disconnection between crest and first dorsal ray; and the pattern.

A key to separate the three forms may be constructed as follows:

A. Anal base about equal to dorsal base; anal insertion midway between tip of longest anal ray (depressed) and pupil; ventral fins reaching beyond anal insertion; dorsal origin over pectoral insertion; longest dorsal ray reaches past base of caudal; crest attached to first dorsal spine; first dorsal without pattern (black or clear).

B.[2] Anal with 11 spines and rays together; snout, 3 to 3.5; color uniformly dark first dorsal black, other fins dusky ..... *L. cyprinoides* (Pallas).

[1]The largest was not selected as type on account of discoloration, due to collecting by means of copper sulphate.

[2]This part of key based on Parr, 1930. Also see Parr's discussion of the status and distribution of *L. cyprinoides* and *pallidus*.

BB. Anal with 9 or 10 spines and rays together; snout, 4 to 4.5; color light, with a pattern of dots, smaller than eye, on body; fins all pale. . . *L. pallidus* Parr.

AA. Anal base about two-thirds of dorsal base; anal insertion midway between tip of longest anal ray (depressed) and pectoral axil; ventral fins falling far short of anal insertion; dorsal origin behind pectoral insertion; longest dorsal ray reaches not quite to narrowest part of peduncle; crest terminates at end of head, not nearly reaching first dorsal spine; first dorsal mottled or barred; pattern of body, one of three horizontal brown stripes breaking into blotches as large as eye, posteriorly; dorsal mottled with black.

L. androsensis, n. sp.

The data on these three species may be expressed by the following tabulation showing the similarities as well. The character showing significant differences from *L. cyprinoides* is italicized in each case.

	L. pallidus	*L. cyprinoides*	*L. androsensis*
Head	3.3	3	3.4
Depth	3.8	2.88	4.1
Dorsal	VI–10, to 12	VI–10	VI– 9 or 10
Anal	11	9–10	9–10
Scales	25–27	27	26
Snout	*3–3.5*	4–4.5	4.4
Eye	3.5	3.35	*3.8*
Maxillary	2.6	2.68	2.6
Reach of longest dorsal ray	Past base of caudal	Past base of caudal	*To peduncle*
Interorbital in eye	*3.0*	2+	2.1
Longest caudal rays	*Upper*	Middle	Middle
Reach of crest	Attached to first dorsal ray	Attached to first dorsal ray	*To end of head*
Anal base in dorsal base	1.0	1.0	*1.5*
Anal insertion midway between tip of longest depressed anal ray and	Pupil	Pupil	*Pectoral axil*
Dorsal color	*Pale*	*Black*	*Mottled* or barred
Pattern on body	*Rows of small dots*	*Plain*	*Rows of blotches*
Ventral fins reach to anal insertion	Beyond	Beyond	*Short of*
Dorsal origin	Over pectoral insertion	Over pectoral insertion	*Behind pectoral insertion*

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